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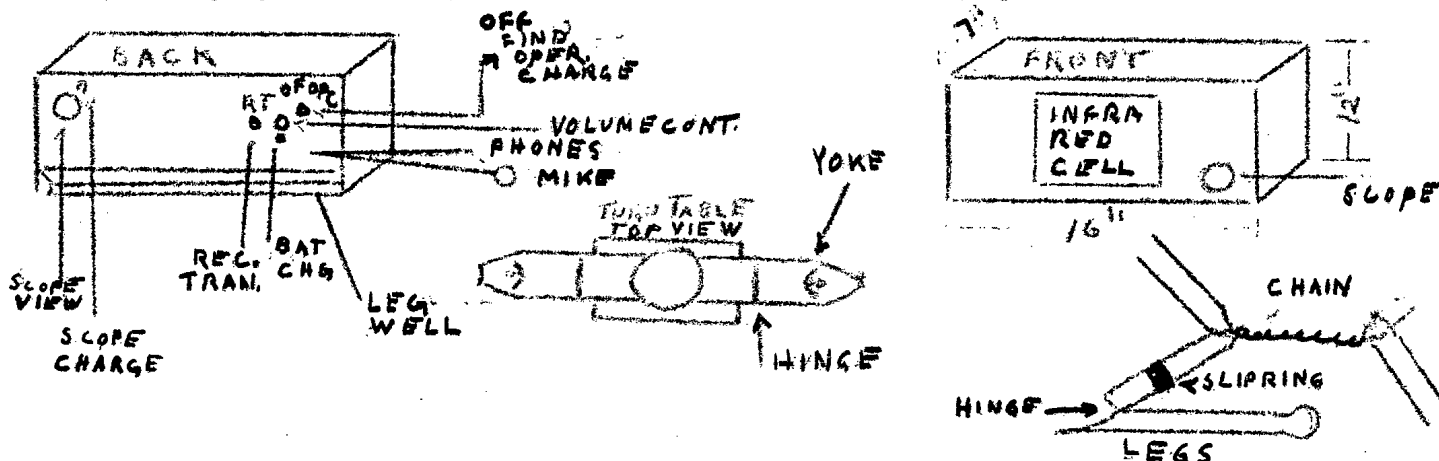
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MEMO FOR THE FILES

SUBJECT: Infrared Communications Equipment Test

PURPOSE: Familiarization and Operational Evaluation of Infrared Voice Equipment.

1. During the week of 1st May a trip was made to [redacted] by [redacted] to [redacted] to operate and evaluate the infrared communications equipment. The equipment itself consisted of two package units each package weighing 30 lbs. and consisting of a complete transmitter, receiver viewer, power supply, and stand. Shown below are a series of drawings giving the size, operational position and controls of the equipment.

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2. Tests began on the morning of arrival at approximately 1100. Two tests were made at this time, two more in the afternoon and the concluding two tests were made at 2300. A total of six (6) tests were made over a 12 hour period covering both day and night conditions. The tests were all made from the same locations and covered a distance of 6000 feet from point to point. It was not possible to make any longer tests due to lack of line of sight distances greater than the 6000 feet, and still retain adequate security. All members of the party aligned and operated the units.

3. Upon completion of the tests and analysis of results the deficiencies of the equipment were discussed and the following items are to be improved:

I. STAND AND TURNABLE

a. The present tubular legs are to be made solid at the joint location. The slip ring broadened and the tapered part of the leg which goes under the slip ring will be lengthened.

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b. The springs holding the legs to the turntable were broken in one case. This was believed due to their having been painted and the action of the paint reducing the elasticity of the spring. All broken springs are to be replaced and tested again.

c. The turntable yoke will be reduced in size and weight and a scale for calibrated settings placed on it.

d. The present thumb screws holding the unit in the yoke will be replaced by one thumb screw from the yoke side of the equipment.

e. The vertical deflection adjust screw will be changed and a larger knob placed on it.

II. BELLOWS

a. The bleeder on the bellows will be increased in size.

b. The bellows will be made of a better material than in presently used. The present material has a tendency to billow and fold wrong and under usage would crack open.

c. The braces holding the bellows open will be changed to the sliding type and if possible will have an automatic lock on them.

III. CARRYING CASE.

a. The catches used on the carrying case will be reduced in number and strengthened.

b. The handle of the carrying case will be increased in size.

IV. EQUIPMENT.

a. A front cover for the lead sulphide cell and the viewer will be provided.

b. A recorder jack will be placed in the equipment.

c. A key input whereby the 1000 cycle tone may be morse keyed when the equipment is in the transmit-find position will be added.

d. A shade or cap will be fitted over the modulation indicator to provide additional security for night operation.

e. The present volume control will be changed from linear to logarithmic taper.

f. A sighting device of some type, either mechanical or optical will be added to the equipment.

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4. It was the general consensus of opinion of all members of the party that the equipment is a very usable item. It meets all requirements placed on it with ease. A discussion with the TSS man in charge determined that the equipment can be realigned and repaired by competent base station personnel. It is our belief that operationally it would be improved by the addition of a 4 to 8 power scope on the equipment for daytime operation. Another improvement also would be closer mechanical tolerance on all moving parts as there is some "play" in them at present. 2.

5. Operationally it was found that night operation of the equipment produced optimum results both in quality of the signal and the time required to align the units with each other. This was determined from the tests when it was found that alignment at night using the infrared scope to spot the other units beam was accomplished very easily while alignment during the day using the 1000 cycle note was quite difficult. At times the note would either be covered by noise or the equipment would have to be exactly aligned to hear the note, while with the scope the equipment could be off to a large extent but the opposite beam would still be visible for alignment purposes. A much more precise knowledge of the physical location of the unit is needed for the daytime operation. There is also a much higher background noise level during the day due to sun and temperature variations. This temperature variation and sun ambients also introduce modulation difficulties in that the terrain over which the beam is established must be of one type. When communications were attempted over a concrete runway during the day a gravel like quality was introduced into the signal making it almost unintelligible. Repeated realignments of the equipment did not help. When the beam was established over the earth however the signal improved a great deal. It can therefore be assumed that any reflecting surface will modulate the beam to some extent during the day. *that*

6. This equipment will be available to Commo approximately the last of August at which time 20 units will be turned over to us. *learn*

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